From grumpy to cheerful (and back): How power impacts mood in and across different contexts

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Abstract

Although lay intuition and some academic theories suggest that power increases variability in mood, the prevailing view in the literature is that power elevates mood—a view that is not consistently borne out in empirical data. To rectify these discrepancies, we conducted five studies examining the impact of high and low power on mood in, and across, contexts of differing valence (negative *vs.* neutral *vs.* positive). Drawing on 19,710 observations from 1,042 participants, we found that high (*vs*. medium/control) power elevated, and low (*vs*. medium/control) power dampened, individuals' mood at baseline/in neutral contexts and in positive contexts. However, neither high (*vs*. medium/control) power nor low (*vs*. medium/control) power modulated individuals' mood in negative contexts. Overall, high (*vs*. medium/control) power tended to increase, and low (*vs*. medium/control) power decreased variability in mood across contexts (the former effect was marginally significant). We discuss how these findings corroborate, but also qualify, lay intuition and social psychological theories of power.

Keywords: social power, mood, context, variability

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In the popular TV series *Breaking Bad* viewers follow Walter White in his transformation from downtrodden high school teacher to powerful criminal linchpin. As Walter's power increases, he seemingly expresses greater happiness and exhilaration in response to positive outcomes. However, his increased happiness is accompanied by seemingly greater surges of unhappiness when circumstances take a turn for the worse. In this sense, Walter's rise to power is accompanied by an increasing variability in mood—defined here as changes in mood between pleasant and unpleasant contexts.

Although some theoretical accounts support an association between power and increased variability in mood (Guinote, 2007a), the dominant view in the literature is that high power elevates mood, and low power dampens mood (Fiske, Gilbert & Lindzey, 2010; Keltner, Gruenfeld & Anderson, 2003). According to the latter perspective, the differential access to resources that characterises states of high and low power modulates brain systems associated with impulsivity, optimism and reward seeking (behavioural approach system), and threat, punishment, and omissions of anticipated rewards (behavioural inhibition system), respectively (Keltner et al., 2003; see also Carver & White, 1994; Gomez, Gomez, & Cooper, 2002; Gray, 1987). From this perspective, it follows that high power fosters positive mood—an affective marker of approach motivation, and low power fosters negative mood—an affective marker of behavioural inhibition (Keltner et al., 2003; but see Gray & McNaughton, 2000, for a more nuanced perspective).

Supporting this view, large scale data measuring proxies of power (e.g., social status, income, dominance) and peer-ratings of status positively predict elevated mood (Clark, 1990; Collins, 1990; Côté & Moskowitz, 2002; Hecht, Inderbitzen, & Bukowski, 1998; Kemper, 1991; Kupersmidt & Patterson, 1991; LaFreniere & Sroufe, 1985). However, research

measuring and manipulating subjective feelings of power finds mixed results. For example, Smith and Hoffmann (2016) tracked individuals' experiences over a three-day period finding an association between high power and elevated mood, and low power and depressed mood, in keeping with a number of previous studies (Anderson & Berdahl, 2002, Study 1; Berdahl & Martorana, 2006; Bombari, Schmid Mast & Bachmann, 2017; Hecht & LaFrance, 1998; Langner & Keltner, 2008; Strelan, Weick & Vasiljevic, 2014; Weick & Guinote, 2008, Study 4; Weick & Guinote, 2010, Study 4; Wojciszke & Struzynska-Kujalowicz, 2007). Importantly, an equally sizable body of research finds no association between power and mood (Anderson & Berdahl, 2002, Study 2; Fast, Gruenfeld, Sivanathan & Galinsky, 2009; Galinsky, Gruenfeld & Magee, 2003; Guinote, Weick & Cai, 2012; Rucker, Dubois & Galinsky, 2011; Smith & Bargh, 2008; Smith & Trope, 2006; Weick & Guinote, 2008, Studies 1a, 2 and 3; Weick & Guinote, 2010, Study 3). This could indicate that the size of the relationship between power and mood is smaller than these studies were designed to detect, or that the relationship is moderated by one or more extraneous variables.

There is reason to assume that the effects of power on mood may vary between contexts. The Situated Focus Theory (Guinote, 2007a) proposes that the psychological consequences of power can be best understood in terms of flexible adaptation to the environment such that power attunes individuals to the present moment and promotes context-consistent thought and behaviour (Guinote, 2007a). An example of this is that high power individuals plan more context-consistent activities (e.g., social activities when visiting a friend) compared to low power individuals (Guinote, 2008; but see Galinsky, Magee, Gruenfeld, Whitson & Liljenquist, 2008). At the level of visual cognition, high power individuals, relative to low power individuals, adjust their attention more flexibly to shift their focus between central and peripheral stimulus features depending on the context (Guinote, 2007a, 2007b).

It is important to pause for a moment and reflect on what 'context' means. Here, we define context as a situational cue that gives rise to psychological states. Situational cues play a central role in social psychology (e.g., Lewin, 1936; Smith & Semin, 2004), and interact with person variables to impact behaviour (Mischel & Shoda, 1995). Situational cues can be tangible and concrete such as an object or a person, or less tangible and more abstract such as one's work climate. In combination, situational cues form a setting (Pervin, 1987) or ecology (Brunswik, 1952). As people bring idiosyncratic characteristics such as goals, prior knowledge, or physical and mental capabilities to bear to a situation, the same cues can be construed differently by different people.

Researchers have developed various approaches to examine how people classify real (Magnusson, 1971; Pervin, 1976) and hypothetical contexts (Forgas & Van Heck, 1992; Vansteelandt & Van Mechelen, 1998), using lists of dictionary-derived terms (Edwards & Templeton, 2005; Van Heck, 1984), experimenter-generated terms (Endler, Hunt & Rosenstein, 1962), and data-driven Q-sort procedures (Rauthmann et al., 2014; Sherman, Nave & Funder, 2010; Wagerman & Funder 2009). This work has uncovered a significant degree of variation in the emergent psychological dimensions that underpin contexts (for a review see Wagerman & Funder, 2009), with data often producing idiosyncratic dimensions, such as 'joint working' (Van Heck, 1984) or 'ease of negotiation' (Edwards & Templeton, 2005). However, valence—that is, positivity and negativity—emerges more consistently and appears to be a fundamental dimension that characterises situational cues (Edwards & Templeton, 2005; Forgas, 1976; Magnusson, 1971; Rauthmann et al., 2014; Sherman et al., 2010). Importantly for the present discussion, people draw on affective experiences to construe the valence of situational cues; positive cues are experienced as pleasant and elicit positive mood, whilst negative cues are experienced as unpleasant and elicit negative mood (Russell & Pratt, 1980).

Returning to the predictions for how power may impact mood in different contexts, it stands to reason that if power-holders are more focused and attuned to the context (Guinote, 2008), high power may elevate mood in situations that are conducive to positive mood, but also depress mood in situations that are conducive to negative mood. In contrast, low power people are cognitively busy and inclined to dwell on multiple pieces of information, some of which may not be relevant for the task at hand (Schmid, Schmid Mast, & Mast, 2015; Smith, Jostmann, Galinsky, & Van Dijk, 2008). As such, low power may elevate mood less in positive contexts, but also depress mood less in negative contexts. In other words, high power may foster greater variability, and low power less variability, in mood across contexts of differing valence (Guinote, 2007a).

To our knowledge, only one study has investigated the relationship between power, mood, and context, finding that participants assigned to a high power role varied more in their mood when planning summer versus winter activities, compared to participants assigned to a low power role (Guinote, 2008). These results are intriguing but derive from a single small sample ($n = 44$), and may be explained by objective differences in the activities participants brought to mind. Moreover, it is difficult to disentangle the effects of high and low power without comparisons with medium/control levels of power (Moskowitz, 2004). This is particularly important because there is some indication that differences in high and low power individuals' mood may derive entirely from the mood-dampening effect of low power (e.g., Hecht & LaFrance, 1998).

The Present Research

The aim of the present research was to examine different perspectives on the link between power and mood. As indicated earlier, the dominant view in the literature is that low power dampens, and high power elevates mood, with little regard for how these associations may vary between contexts (Fiske et al., 2010; Keltner et al., 2003). Other perspectives

suggest that the mood-bolstering effects of power only emerge in pleasant contexts, but not in unpleasant contexts, thereby producing greater variability in mood between contexts (Guinote, 2007a). To investigate these theoretical predictions, we conducted five studies in which we examined participants' mood repeatedly in contexts of differing valence (negative *vs.* baseline/neutral *vs.* positive). Within and across studies, we sampled a wide range of contexts (see Table 1), thereby not only creating optimal conditions to investigate variability in mood, but also ensuring our findings have broad applicability. Similarly, to ensure that findings emerging from the present studies are generalizable and not restricted to a particular way of operationalising power (cf. Tost, 2015), we draw on relevant individual differences, episodic priming techniques, and structural power manipulations to examine the association between both high and low power and mood.

Below, we report two initial studies (Studies 1a and 1b) looking at the relationship between chronic feelings of power and mood in different imagined contexts. In a third study (Study 2), we employ experience sampling to examine the association between chronic feelings of power and mood in everyday life situations. In a final set of studies (Studies 3 and 4), we manipulate power and examine mood in response to different music and images, respectively. In all our studies, we sought to isolate the effects of both high and low power through comparisons with medium/control levels of power.

In the studies reported below, we adopt a cumulative approach and focus on overarching trends that emerge at the meta-level, across all studies. We adopt this approach because findings obtained in individual studies can be misleading, especially when effect sizes are small and produce seemingly inconsistent results (Cumming, 2014)—a familiar pattern in the extant literature on power and mood. A meta-analytic approach enables us to unveil small effects, enhances the robustness of our findings, whilst also allowing us to draw

firmer conclusions from null-results (see Goh, Hall, and Rosenthal, 2016, for a more comprehensive discussion of the benefits of a meta-analytic approach).

Method

Participants

Study 1a. Two-hundred and thirteen students from a European university participated in exchange for course credits. Seventeen participants were excluded as they failed pre-planned attention checks (e.g., "*If you are reading this please select 4*"), leaving a final sample of 196 (172 female; M_{age} = 20.16, *SD* = 4.62).

Study 1b. Two-hundred and eighty-nine paid workers from the U.S. participated through *Amazon Mechanical Turk* in exchange for $0.80. Fourteen participants were excluded as they failed pre-planned attention checks, leaving a final sample of 275 participants (109 female; M_{age} = 23.96, *SD* = 11.06).

Study 2. Two-hundred and thirty-two students from a European university participated in exchange for course credits. The study employed ecological momentary assessment using a smartphone application, and forty-two participants were excluded due to failing pre-planned attention checks (*n* = 6), equipment error (*n* = 12), software adaptability issues (*n* = 9) or lack of responses (*n* = 17), leaving a final sample of 190 participants (167 female; M_{age} = 20.22, *SD* = 2.20).

Study 3. Two-hundred and nineteen students from a European university participated in exchange for course credits. Twenty-two participants were excluded due to not adhering to the procedure (*n* = 3), identifying the aim of the study (*n* = 18; see Table S1 in Supplemental Materials for supporting information and further details on excluded participants) or equipment error (*n* =1), leaving a final sample of 197 participants (154 female; M_{age} = 19.75, *SD* = 3.35).

Study 4. One-hundred and ninety-three students from a European university participated in exchange for course credits and the chance to win £50 in a cash draw. Nine participants were excluded due to equipment error (n = 3), identifying the aim of the study (n = 4; see also Table S1) or requesting to prematurely end the study (n = 2), leaving a final sample of 184 participants (138 female; M_{age} = 19.74, SD = 3.08).

Statistical Power. Our combined analysis of 19,710 observations derived from 1,042 participants had more than 90% power to detect a small effect of power on mood (high *vs.* medium/control, or low *vs.* medium/control).

Procedure and Materials

Participants completed the study online (Studies 1a and 1b), on their mobile phones (Study 2) or in the lab (Studies 3 and 4). The studies purported to examine planning events (Studies 1a and 1b), life experiences (Study 2), music taste (Study 3) or health (Study 4). Participants completed an individual difference measure (Studies 1a, 1b and 2) or manipulation (Studies 3 and 4) of power, followed by a measure of self-reported mood at baseline ("*How do you generally feel?"*; Studies 1a and 1b). Participants then reported their mood in neutral contexts (Studies 2, 3 and 4), and positive and negative contexts (Studies 1-4; see Table 1). Contexts were presented in a randomized order in all studies (bar Study 2). All participants were probed for suspicion and debriefed.

Table 1.

Overview of the operationalisations of context, number of sampled stimuli and example stimuli for each stimulus category (Studies 1-4). Tables S18-S23 in Supplemental Materials provide full lists of stimuli and further details on pre-tests.

			Example Stimuli		
Sample	Operationalisation	# Sampled Stimuli	Negative	Baseline/Neutral	Positive
Study 1a	Imagined Context	3	Exam day	*How do you generally feel?*	Summer day
Study 1b	Imagined Context	17	*You have been sued for negligence*	*How do you generally feel?*	*You have been promoted*
Study 2	Circadian rhythm	21	Non-preferred times of the day	Times of the day for which participants are indifferent	Preferred times of the day
Study 3	Music	25	*Street Killer - Terry Devine-King*	*Losing Your Winter Fur - Sue Verran*	*Heroes Return - Luke Richards*
Study 4	Images	48	Pollution	Towel	Erotic Couple

Operationalisation of Power. In Studies 1a, 1b and 2, participants indicated how much control they had over others in their everyday life (e.g., "*I can get people to listen to what I say*"; Anderson, John, & Keltner, 2012), from 1 (*Disagree strongly*) to 7 (*Agree strongly*). This measure was administered twice in Study 2, seven days apart. In Studies 3 and 4 power was manipulated by randomly assigning participants to one of three conditions, in which they described a past event where they felt powerful, powerless, or a neutral event (Study 3; see Galinsky et al., 2003), or were led to believe they would take part in a group task with a second participant (Study 4; see Guinote, 2008). In the group task, participants were informed that they would be assigned either to a Director (high power) or Worker (low power) role; entailing differential access to rewards. The Director was asked to lead the group task and was granted six lottery tickets (for a single £50 draw) irrespective of his/her performance in the task. The Worker was asked to take a subordinate role in the group task, and was granted as many lottery tickets as the Director deemed commensurate with their performance (from 2-8). In reality, all participants received one lottery ticket and therefore had an equal chance to win the cash prize. No roles were mentioned for participants in the control condition. Following the power manipulations, participants indicated how much control and influence they had in the recalled event or assigned role, from 1 (*Not at all*) to 9 (*Very much*; Studies 3 and 4). These items served as manipulation checks.

Operationalisation of Context. In Study 1a, participants planned two future days, during the summer in the weekend (positive), and during exam period in the week (negative; see Guinote, 2008). In Study 1b, participants imagined themselves in two positive (e.g., "*You receive a prestigious award*") and two negative contexts (e.g., "*You are the victim of a theft*"), randomly sampled from a pool of sixteen items (i_{pos} = 8, i_{neg} = 8). The sixteen contexts were selected based on a pre-test using a larger pool of items (i = 40; see Tables S16 and S17 in Supplemental Materials for full details). Study 2 involved ecological momentary

assessment, and positive and negative contexts derived from a combination of the time of the day and participants' circadian rhythm; that is, participants' preference towards evenings or mornings. This was assessed via the Reduced Morning-Evening Questionnaire (Adan & Almirall, 1991)—a five item scale (e.g., "*One hears about 'morning' and 'evening' types. Which one of these do you consider yourself?*") from 1 (*Definitely morning type*) to 4 (*Definitely evening type*). Preferred times of the day provided a positive context, non-preferred times of the day a negative context, and times of the day for which participants were indifferent provided a neutral context.

In Studies 3 and 4, participants were presented with a series of music excerpts (Study 3) or images (Study 4) selected from a larger pool of items based on pre-test scores (see Tables S18-S21 in Supplemental Materials). In Study 3, participants listened to 25 (1 neutral, 12 positive, 12 negative) excerpts of musicals (30s duration) played twice successively through a pair of over-ear headphones at a loud but comfortable volume (~70dB). In Study 4, participants viewed 48 (16 positive, 16 neutral, 16 negative) images (6s viewing time) selected from the International Affective Picture System and using the reference values provided (IAPS; Lang, Bradley & Cuthbert, 1999).

Measurement of Mood. In Study 1a participants completed the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988)—a 20-item measure (e.g., *Afraid, Enthusiastic*) rated from 1 (*Very slightly or not at all*) to 5 (*Extremely*). In Study 1b participants completed an Affect Semantic Differential Scale—a 6-item bipolar self-report measure of affective valence (Mehrabian & Russell, 1974), from -3 (e.g., *Unhappy*) to +3 (e.g., *Happy*).

In Study 2, participants installed Google's Personal Analytics Companion (PACO; Version 1.1.7.1; Google, 2015) on their smart phones. The application was set to signal three times a day at random intervals, between the times of 10 a.m. and 8 p.m. Signals were

restricted to appear no less than 30 minutes apart. Following an initial lab session (day 0), participants reported on their affective experiences for seven days (day 1-7) whilst pursuing everyday activities. On receiving a signal, participants indicated their current mood on a 3-item measure, from 1 *(Unhappy, Scared, Sad)* to 7 *(Happy, Peaceful, Enthusiastic;* Yik, Ruseel & Steiger, 2011).

In Studies 3 and 4, participants reported their mood from 1 (*Negative*) to 9 (*Positive*) using the Self-Assessment Manikin (Bradley & Lang, 1994)—a non-verbal pictorial assessment measure of affective valence.

Exclusions

We report all relevant studies that we conducted in this line of research, all relevant measures, all conditions (where applicable), and all participant exclusions (see Participants section above). Tables S2 and S3 provide comparisons of the results when suspicious participants are retained (*vs.* excluded); the results are unaffected. For exploratory purposes, Studies 1b, 2, 3 and 4 also incorporated measures of arousal, which revealed no systematic differences between high and low power participants. Study 4 also incorporated physiological measures (facial electromyography; electrodermal activity), which yielded similar results as the self-report measures. To enable the combined analysis of all five studies presented below, the physiological measures are not discussed further.

Results

Data preparation

All study-level data were collected and, if required, participants excluded, prior to analysis (see Participants section above for exclusion criteria). Multi-item measures were averaged to derive composites prior to analyses ($as > .74$, $rs > .76$).

In Study 1a, participants' PANAS scores on the negative dimension did not correlate with scores on the positive dimension ($rs < .04$). We subtracted the former scores from the

latter scores to provide an index of overall mood at baseline, weekends and weekdays (a typical approach to assess mood; see Bradburn, 1969; Diener et al., 2010; Sutton & Davidson, 1997). Higher scores represent more positive mood. In Study 1b, we averaged mood scores at baseline, and for each context.

In Study 2, the Time 1 and Time 2 Sense of Power measures were collapsed (r = .72). Responses to the Morning-Evening Questionnaire were summed and then categorized into five 'types' following Adan and Almirall (1991); $n_{\text{DefinitelyEvening}}$ = 24, $n_{\text{ModeratlyEvening}}$ = 68, n_{Neither} = 87, $n_{\text{ModeratlyMorning}}$ = 11, $n_{\text{DefinitelyMorning}}$ = 0. Due to the lack of morning types we collapsed the first two and last three categories, classifying participants as either evening or non-evening types (n_{Evening} = 92, $n_{\text{Non-Evening}}$ = 98). Responses were coded based on the time of day, from 1 (10 a.m.–12 noon) to 5 (6–8 p.m.), and then classified as positive (6–8 p.m. for evening types), negative (10 a.m.–12 noon for evening types), or neutral (10 a.m.–8 p.m. for non-evening types). Responses recorded more than 10 minutes following a notification were excluded prior to the analysis (i_{excluded} = 186; 4% of all scheduled responses). To aid cross-study comparisons, Sense of Power (Studies 1a, 1b and 2) scores were converted into tertiles (Low *vs.* Medium *vs.* High).[1]

Operationalisation Check

[1] Creating tertiles based on participants' responses to a continuous measure is a common procedure (e.g., Cohen et al., 2008; Giannopoulos, & Vella-Brodrick, 2011; Kim, Bursac, DiLillo, White, & West, 2009). Reduced statistical power and attenuated effect sizes are important drawbacks of this approach (MacCallum, Zhang, Preacher, & Rucker, 2002). Because creating tertiles enables us to perform a more high-powered analysis than we would otherwise be able to conduct, we maintain that our approach implies a worthwhile trade-off. Note that in the present studies the second independent variable (context: negative *vs*. neutral *vs*. positive) is an experimental variable, and as such not correlated with the underlying *sense of power* construct. The lack of a correlation between underlying constructs implies that by creating tertiles we do not risk inflating the likelihood of obtaining spurious results (Maxwell & Delaney, 1993; Vargha, Rudas, Delaney, & Maxwell, 1996). Finally, it is also worth noting that it is standard practice in meta-analysis to combine information derived from continuous and categorical variables that tap into the same underlying construct (e.g., Harter, Schmidt, & Hayes, 2002; Ozer, Best, Lipsey, & Weiss, 2003; Tett & Meyer, 1993).

Power. The tertile groupings (Studies 1-2), priming (Study 3) and role assignment (Study 4) manipulations successfully predicted feelings of power (see Table 2). As expected, feelings of power linearly increased, from low, to medium to high power.

Table 2.

Feelings of power in low, medium/control and high power groups.

	Power			
Sample	Low	Medium/Control	High	Power main effect
Study 1a	$3.43_a(0.66)$	$4.58_b(0.21)$	$5.54_c(0.44)$	$F(2, 193) = 327.51$, $p < .001$, $\eta_p^2 = .77$
Study 1b	$3.30_a(0.75)$	$4.77_b(0.33)$	$5.92_c(0.41)$	$F(2, 272) = 564.56$, $p < .001$, $\eta_p^2 = .81$
Study 2	$3.67_a(0.52)$	$4.56_b(0.18)$	$5.36_c(0.41)$	$F(2, 187) = 286.76$, $p < .001$, $\eta_p^2 = .75$
Study 3	$2.60_a(1.40)$	$4.46_b(1.68)$	$7.57_c(1.08)$	$F(2, 194) = 193.21$, $p < .001$, $\eta_p^2 = .67$
Study 4	$3.54_a(1.51)$	$5.06_b(1.07)$	$7.51_c(1.17)$	$F(2, 181) = 156.17$, $p < .001$, $\eta_p^2 = .63$

NB: Observed means and standard deviations in parentheses. Higher values indicate greater feelings of power. Means not sharing a common subscript within rows are significantly different ($p < .05$; adjusted for multiple comparisons via Dunn-Šidák correction).

Context. Participants reported more positive mood in positive contexts, and more negative mood in negative context, compared to baseline (Studies 1a and 1b) or neutral contexts (Studies 2, 3 and 4; Table 3). Thus, the sampling of contexts of opposing valence was successful.

Table 3.

Mood in different contexts (Studies 1-4).

	Context			
Sample	Negative	Baseline/Neutral	Positive	Valence main effect
Study 1a	$0.38_a(1.16)$	$0.94_b(1.06)$	$1.81_c(1.02)$	$F(2, 390) = 143.50$, $p < .001$, $\eta_p^2 = .43$
Study 1b	$2.21_a(0.71)$	$5.01_b(1.28)$	$5.85_c(1.01)$	$F(2, 548) = 1081.78$, $p < .001$, $\eta_p^2 = .80$
Study 2	$4.54_a(0.99)$	$4.82_b(0.64)$	$5.01_b(0.64)$	$F(1, 86) = 20.82$, $p < .001$, $\eta_p^2 = .20$*
Study 3	$4.38_a(1.51)$	$5.56_b(1.51)$	$6.04_c(0.86)$	$F(2, 392) = 114.27$, $p < .001$, $\eta_p^2 = .37$
Study 4	$2.71_a(0.95)$	$5.12_b(0.52)$	$6.76_c(0.75)$	$F(2, 366) = 1213.22$, $p < .001$, $\eta_p^2 = .87$

NB: Observed means and standard deviations in parentheses. Higher values indicate more positive mood. Means not sharing a common subscript within rows are significantly different ($p < .05$; adjusted for multiple comparisons via Dunn-Šidák correction). *In Study 2 baseline/neutral contexts were experienced as more positive than negative contexts, $t(183) = -2.31$, $p = .022$, $d = -0.34$, and less positive than positive contexts, $t(188) = 1.86$, $p = .063$, $d = 0.30$, although the latter comparison was marginally significant.

Main Analysis

As indicated earlier, we chose to focus on overall variations in mood at the meta-level. This approach maximizes statistical power and allows us to identify trends that generalize across studies. As context (negative *vs.* baseline/neutral *vs.* positive) is nested within participants our data lend themselves to multilevel modelling (for discussion of benefits associated with this procedure see Quené & Van den Bergh, 2004). We fitted a random intercept and slope model with homogenous variances to the mood data (Studies 1-4). We allowed the intercepts to vary randomly, modelling mean-level differences between studies, stimuli and participants. Slopes were allowed to vary randomly between contexts nested within participants. We added fixed coefficients to estimate the effects of power and context. Two dummy variables compared high ($D_1=1$, $D_2=0$) and low ($D_1=0$, $D_2=1$) power with medium power/controls, and two dummy variables compared positive ($D_3=1$, $D_4=0$) and negative ($D_3=0$, $D_4=1$) contexts with baseline/neutral contexts. All (two-way) interactions

between the power and context dummy variables were included in the model. Tables 4 and 5 provide overviews of all relevant study- and meta-level fixed effects of power (D_1, D_2). Full details on all variance estimates for the multi-level meta-analyses and descriptive statistics are provided in Supplemental Materials (Tables S4-S15).

Mood in Different Contexts. Across studies at baseline/in neutral contexts, high (*vs*. medium/control) power was associated with more positive mood, $coeff_{D1} = 0.12$, SE = 0.06, 95% CI [0.00, 0.23], $p = .046$, $r = .06$, while low (*vs*. medium/control) power was associated with more negative mood, $coeff_{D2} = -0.29$, SE = 0.06, 95% CI [-0.41, -0.18], $p < .001$, $r = -.14$ (see Table 4).

To investigate the effects of high and low power in different contexts we recoded the context dummy variables so as to provide estimates of the effects of power in positive (neutral: $D_3 = 1$, positive: $D_3 = 0$) and negative contexts (neutral: $D_4 = 1$, negative: $D_4 = 0$), respectively. We then re-ran our multi-level analysis, which yielded similar results in positive contexts as it did at baseline/in neutral contexts. In particular, high (*vs*. medium/control) power bolstered, $coeff_{D1} = 0.24$, SE = 0.06, 95% CI [0.13, 0.35], $p < .001$, $r = .11$, and low (*vs*. medium/control) power dampened, individuals' mood, $coeff_{D2} = -0.20$, SE = 0.06, 95% CI [-0.32, -0.09], $p < .001$, $r = -.10$. Looking at negative contexts, we found no effect of high (*vs*. medium/control) power, $coeff_{D1} = 0.08$, SE = 0.07, 95% CI [-0.05, 0.21], $p = .241$, $r = .03$, or of low (*vs*. medium/control) power, $coeff_{D2} = -0.03$, SE = 0.07, 95% CI [-0.16, 0.10], $p = .619$, $r = -.01$. Thus, individuals' mood in negative contexts was similarly dampened across the power spectrum.

Table 4.

Predicted variations in mood as a function of high (vs. medium/control) and low (vs. medium/control) power within negative, baseline/neutral, and positive contexts (Studies 1-4 and Meta-Level).

	Negative Context					Baseline/Neutral Context					Positive Context				
Parameter/Study	Coeff.	SE	95% CI		*r*	Coeff.	SE	95% CI		*r*	Coeff.	SE	95% CI		*r*
High Power (*vs.* Medium/Control) Power															
Study 1a	0.50_{a}^{**}	0.18	0.14	0.86	.13	0.34_{a}^{*}	0.17	0.00	0.67	.13	0.18_{a}	0.17	-0.16	0.52	.06
Study 1b	-0.21_{a}^{*}	0.08	-0.38	-0.05	-.11	0.51_{b}^{***}	0.12	0.28	0.74	.15	0.32_{b}^{***}	0.08	0.16	0.47	.17
Study 2	-0.02_{a}	0.18	-0.38	0.34	-.00	0.10_{a}	0.11	-0.12	0.32	.06	0.33_{a}^{*}	0.16	0.01	0.65	.08
Study 3	0.16_{a}	0.17	-0.17	0.49	.07	-0.02_{a}	0.23	-0.47	0.43	-.00	0.05_{a}	0.14	-0.23	0.33	.02
Study 4	0.03_{a}	0.16	-0.28	0.34	.01	0.11_{a}	0.09	-0.07	0.27	.09	0.30_{a}^{*}	0.12	0.07	0.53	.19
Meta	0.08_{a}	0.07	-0.05	0.21	.03	0.12_{a}^{*}	0.06	0.00	0.23	.06	0.24_{a}^{***}	0.06	0.13	0.35	.11
Low Power (*vs.* Medium/Control) Power															
Study 1a	-0.03_{a}	0.19	-0.40	0.33	-.01	-0.41_{a}^{*}	0.17	-0.74	-0.08	-.14	$-0.33_{a}^{\dagger}$	0.18	-0.68	0.02	-.10
Study 1b	-0.07_{a}	0.08	-0.24	0.09	-.04	-1.17_{b}^{***}	0.12	-1.40	-0.93	-.32	-0.27_{ac}^{**}	0.08	-0.44	-0.11	-.15
Study 2	0.16_{a}	0.20	-0.22	0.55	.02	-0.26_{b}^{*}	0.11	-0.48	-0.05	-.17	0.06_{a}	0.17	-0.27	0.40	.01
Study 3	-0.18_{a}	0.16	-0.49	0.14	-.08	-0.57_{a}^{**}	0.22	-0.99	-0.14	-.07	-0.31_{a}^{*}	0.13	-0.58	-0.05	-.16
Study 4	0.20_{a}	0.16	-0.11	0.51	.09	0.06_{a}	0.09	-0.12	0.23	.05	0.00_{a}	0.12	-0.23	0.23	.00
Meta	-0.03_{a}	0.07	-0.16	0.10	-.01	-0.29_{b}^{***}	0.06	-0.41	-0.18	-.14	-0.20_{b}^{***}	0.06	-0.32	-0.09	-.10

NB: ***$p < .001$, **$p < .01$, *$p < .05$, $^{\dagger}p < .10$. Coefficients above 0 indicate more positive mood, and coefficients below 0 indicate more negative mood, relative to medium power/controls, which serves as a reference group. Coefficients not sharing a common subscript within rows are significantly different ($p < .05$). Effect sizes are derived from *t*-values and degrees of freedom obtained through Satterthwaite's approximation. See Tables S8-S10, for details on all variance estimates. For comparisons between high and low power groups see Tables S12-14.

Variability in Mood between Contexts. In a final step, we sought to examine how much individuals' mood varied between contexts of opposing valence. To this end, we re-ran our analysis, this time ignoring responses at baseline/in neutral contexts. In this model, interactions involving dummies representing different levels of power (high: D_1=1, D_2=0; low: D_1=0, D_2=1) and different contexts (negative: D_3=0, positive: D_3=1) (i.e., D_1xD_3 and D_2xD_3) provide estimates of variability between negative and positive contexts that can be attributed to low and high power, respectively. As shown in Table 5, across studies participants with high (*vs*. medium/control) power exhibited more, $coeff_{D1*D3}$ = 0.18, SE = 0.10, 95% CI [-0.01, 0.37], p = .064, r = .05, and participants with low (*vs*. medium/control) power less, $coeff_{D2*D3}$ = -0.19, SE = 0.10, 95% CI [-0.38, -0.00], p = .049, r = -.06, variability in their mood, although the former effect was only marginally significant.

Table 5.

Predicted differences in mood between contexts (negative vs. positive) as a function of high (vs. medium/control) and low (vs. medium/control) power (Studies 1-4 and Meta-Level).

Parameter/Study	Coeff.	SE	95% CI		*r*
High (*vs.* Medium/Control) Power x Context (Neg. *vs.* Pos.)					
Study 1a	-0.31	0.23	-0.77	0.14	-.10
Study 1b	0.53***	0.12	0.30	0.76	.19
Study 2	0.38†	0.21	-0.04	0.80	.13
Study 3	-0.11	0.20	-0.51	0.28	-.04
Study 4	0.27	0.26	-0.24	0.77	.08
Meta	0.18†	0.10	-0.01	0.37	.05
Low (*vs.* Medium/Control) Power x Context (Neg. *vs.* Pos.)					
Study 1a	-0.30	0.23	-0.76	0.16	-.09
Study 1b	-0.20†	0.12	-0.44	0.03	-.07
Study 2	-0.09	0.23	-0.55	0.36	-.03
Study 3	-0.14	0.19	-0.51	0.24	-.05
Study 4	-0.20	0.26	-0.70	0.31	-.06
Meta	-0.19*	0.10	-0.38	-0.00	-.06

NB: ***$p < .001$, **$p < .01$, *$p < .05$, †$p < .10$. Coefficients above 0 indicate greater variability in mood, and coefficients below 0 indicate lesser variability in mood, relative to medium power/controls, which serves as a reference group. Table S11 provides details on variance estimates for the multi-level meta-analysis. For comparisons between high and low power groups see Table S15.

Discussion

Across five studies, employing different operationalisations of power (individual differences, priming, role assignment) and context (imagined situations, ecological assessment/circadian rhythm, music- and image-induction), and sampling a wide range of stimuli of differing valence (negative *vs.* neutral *vs.* positive), we found that high (*vs.* medium/control) power increased positive mood at baseline/in neutral contexts and in

positive contexts, but not in negative contexts (although the effect of high power in negative contexts was not significantly different from that observed in other contexts). Meanwhile, low (*vs.* medium/control) power increased negative mood at baseline/in neutral contexts and in positive contexts, but not in negative contexts. Overall, the mood of high power participants varied (marginally) more, and the mood of low participants varied less, between contexts of opposing valence (negative *vs*. positive) when compared to controls/participants with medium levels of power.

The present findings are broadly consistent with the view that high power elevates mood and low power depresses mood (Keltner et al., 2003). However, our studies also highlight the importance of contextual factors showing that the mood-bolstering effects of power only emerge in neutral and in positive contexts, but not in negative contexts. We return to the theoretical implications after a brief discussion of strengths and limitations of the present programme of research.

Strengths and Limitations

Our methodological approach, using a large set of stimuli representing positive, negative and neutral contexts (i = 114) and treating stimuli as a random factor sampled from a population, avoids pitfalls associated with typical analyses of variance procedures (e.g., Judd, Westfall & Kenny, 2012) and enhances the generalisability of our findings by minimising the chances that the present findings are merely an artefact of idiosyncratic stimulus features (e.g., Westfall, Judd & Kenny, 2015). Relatedly, we took a bird's eye view in our analysis, incorporating all our data and treating 'studies' as a random factor to unveil overarching trends (Cumming, 2014).

The literature on power is characterized by a conceptual focus on high power, and by empirical work that draws on comparisons between opposite ends of the power spectrum. In the present studies, we sought to counter these trends, separating the contributions of high

and low power to individuals' mood through comparisons with medium power/controls. Our focus on comparisons with medium power/controls is one reason why the effects observed in our studies were small. Comparisons between the two ends of the power spectrum (see Tables S12-S15 in Online Supplemental Materials) revealed more sizable associations between power and mood in neutral and positive contexts (*r*s = .23 and .25, respectively), but not in negative contexts (*r* = .06). There are reasons to assume that the present studies may provide conservative estimates of the effects of power. Strong environmental affordances, such as those providing a negative and positive context in our studies, prompt unambiguous responses, minimizing differences between individuals (e.g., Snyder & Ickes, 1985). Similarly, as our studies (bar Study 2) randomly sampled contexts of differing valence and in relatively swift succession, carry-over effects may have weakened the effects of power. The present research could be usefully extended in future studies examining more subtle contextual drivers of mood and/or more enduring contexts that have a more prolonged impact on individuals' mood.

With the relative strength of the mood manipulations in mind, it is important to address the possibility that the (null) effects of power in negative contexts were due to floor effects. However, a closer examination of individuals' responses (see Tables S2-S7) indicates that there was ample room for participants to express greater negative mood, if desired; there was in fact less 'headroom' to report changes in mood in positive contexts. Thus, floor or ceiling effects cannot account for the patterns of results observed in the present studies.

Implications and Future Directions

The present findings corroborate lay intuition and predictions arising from the Situated Focus Theory of Power (Guinote, 2007a), which suggests that power increases variability in mood. However, our findings also provide important qualifications by showing that much of this greater variability may, in fact, derive from low (*vs*. medium/control) power

rendering individuals' mood more uniform across contexts. This is noteworthy as to the best of our knowledge no previous programme of research has systematically investigated the independent contributions of low and high power to judgmental and/or behavioural variability, with the majority of prior studies focusing on comparisons between the two ends of the power spectrum (see Guinote, 2007a, for a review).

It is also of note that high and low power individuals' mood was similarly dampened in negative contexts, suggesting that the greater (/lesser) variability observed in individuals with high (/low) power can be attributed to the mood-bolstering effects of high power on the one hand, *and* to the mood-dampening effects of low power observed in positive contexts on the other. Given that positive mood is a marker of approach motivation (e.g., Gray, 1987), one implication of these findings is that the association between power and approach motivation may not be universal (cf. Keltner et al., 2003). Instead, high power may be associated with more frequent shifts in motivational states depending on the context, and this could be a mechanism through which power fosters greater variability in judgement and behaviour. A corollary of this is that situated approach-motivation may be a common denominator that unifies the Situated Focus Theory of Power and the Approach/Inhibition Model of Power (Guinote, 2007a; Keltner et al., 2003).

Contrary to the predictions arising from the Situated Focus Theory of Power (Guinote, 2007a), there was no indication that high power dampened individuals' mood in negative contexts. One possible explanation for this finding is that high and low power individuals may be equally attuned to negative affordances, as negative stimuli are often strong drivers of cognition (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001). This would be consistent with evolutionary accounts of cognition (e.g., Öhman, Flykt, & Esteves, 2001). There is some initial indication that when powerholders are threatened, their actions resemble those of powerless individuals (Lammers, Galinsky, Gordijn & Otten, 2008; Maner, Galliot,

Butz & Peruche, 2007). The present research suggests that this pattern may reflect a more general trend for powerholders to be equally attuned to salient negative cues.

High power is often thought of as being hedonically rewarding. Henry Kissinger famously described power as an 'aphrodisiac', while Philip Zimbardo noted the exhilarating effects of power in his prison experiment (Haney, Banks & Zimbardo, 1973). In the present research, power improved individuals' mood in otherwise neutral contexts, but this effect was relatively small and would hardly justify to be called 'exhilarating'. These discrepancies between anecdotal and empirical evidence dovetail recent findings that people may be inclined to overestimate positive qualities associated with having power (Leach, Weick, & Lammers, 2017). The present research suggests that the effects of power on mood are fairly modest, and much of the hedonic value of power derives from how power interacts with opportunities and rewards in the environment.

Related to the previous point, the present findings are likely qualified by whether power is associated with responsibility or with independence; these variables are differentially attractive and may have opposite effects on mood and well-being (e.g., Deci & Ryan, 2010; Fuligni, 1998; Sassenberg, Ellemers & Scheepers, 2012). Thus, circumstances in which power is construed as responsibility may not be conducive to more positive mood states, even in otherwise positive contexts. This would be consistent with studies conducted in collectivistic cultural settings finding that power is associated with negative mood (Datu & Reyes, 2015). Future studies should examine if and how the present findings generalise to different cultural settings.

In sum, the prevailing view that high power elevates mood, and low power dampens mood, may be overly simplistic (Fiske et al., 2010; Keltner et al., 2003). Whilst high power seems to be associated with richer affective experiences than low power, the precise manner

in which power contributes to shape individuals' affective worlds may depend largely on the context.

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